BOTANICAL GAZETTE.

VOL. IX. FEBRUARY, 1884. No. 2.

Some North American Botanists.

IX. LEWIS DAVID DE SCHWEINITZ.

BY A. P. MORGAN.

A little sketch of the labors of the celebrated de Schweinitz in the department of mycology, may give some notion of the large and varied field of natural objects open to the eyes of the inquiring botanist in every locality, and may also give good encouragement as to the amount that may be accomplished by working therein, provided the work be done in a persistent and systematic way.

It is greatly to be desired that some one, as Mr. Rau, in a position to obtain the facts, should give us an extended account of the life and labors of this great botanist. In so far as I may touch upon his biography, I quote from memory and aim only to be generally correct, but, in reference to his labors, I have before me the "*Synopsis Fungorum in America Boreali media degentium*," communicated to the American Philosophical Society, Philadelphia, 15 April, 1831.

Lewis David de Schweinitz was born at Bethlehem, Pa., in 1794, and sent to Europe to receive his education. He there distinguished himself in mycologic studies, and with Albertini, published the "*Conspectus Fungorum in Lusatia superiori.*" Returning to his native land, he settled at Salem, N. C., where he remained a few years. The results of his mycologic studies in this locality were published at Leipsic, in 1818, by his friend, the celebrated Schwaegrichen, as "*Synopsis Fungorum Carolinæ Superioris.*" In 1821 he returned to his native village in Pennsylvania, where his delightful studies were continued till his death, which occurred, I think, in 1834. He enjoyed the friendship of the most distinguished botanists of his time, both in Europe and in this country. With the vigorous prosecution of studies in Fungology, his merits as a close and careful student

of nature and his important contributions to botanical knowledge will be recognized.

The *Synopsis Fungorum in America Boreali* enumerates more than three thousand species, divided among the classes as follows:

Hymenomycetes	1146
Pyrenomycetes	1055
Gasteromycetes	297
Hyphomycetes	312
Gymnomycetes	289
Total	3099

Of these 1216 are new species, natives of America, while the remaining 1883 are identical with European forms; that is, 40 per cent. are native species, and 60 per cent. common to both countries. The great genus *Sphæria* alone contains 680 species, of which 387 are new. *Peziza* stands with 213 species, 58 of them new. *Polyporus* contains 153 species, 41 new. But it seems rather singular that he should not have been able to add more than 14 new species to the great genus *Agaricus*. The labor on these plants seems to have been reserved for our own time. Prof. Charles H. Peck, in his reports up to date, enumerates 525 species of *Agaricini*, of which 272 are new.

After his return from Europe how de Schweinitz must have reveled in the novelties of the New World! With what delight he must have beheld the magnificent *Agaricus illudens*, and with what wonder the singular *Mitromyces lutescens!* With what pleasure he must have gathered the first specimens of the fairy *Peziza floccosa!*

The system in which his plants are enrolled is partly that of Fries and partly that of older botanists; he did not have access to the third volumes of the *Systema Mycologicum*. In the elucidation and rearrangement of his species a very inviting field and a meritorious work is open to the systematic Fungologist. Many changes are being made and much new discovery; the great genus *Sphæria* is now broken up into orders and numerous genera. It seems singular that the Fungi that can be perfectly preserved, that are the most easily studied, should be in such a chaotic state of classification.

It is to be regretted that de Schweinitz has not given us more of his views on the life-histories of the Fungi, which are so interesting at this time; his maturity of observation would undoubtedly have enlightened many dark points. It is a signifi-

cant fact, for example, that while he mentions *Puccinia graminis* as "vulgatissima in graminibus," he does not chronicle *Æcidium Berberidis*.

The herbarium of de Schweinitz rests in the Academy of Natural Sciences, Philadelphia. It is very much to be desired that a reprint be made of the *Synopsis Fungorum*, as it is practically inaccessible to the ordinary student. Still more desirable is it that a *Synopsis Fungorum* be compiled that shall include all the North American species identified and described up to the present time, and which now, perhaps, more than double in number the enumeration of de Schweinitz.

A Botanical Holiday in Nova Scotia. II.

BY T. J. W. BURGESS, M. D.

By June 21st we had exhausted the time laid out to be spent in the neighborhood of Halifax, and taking the Windsor and Annapolis Railway to the latter place, caught the steamer crossing to Digby. Here we were first able truly to realize the wonderful rise of the tide in the Bay of Fundy, our landing being made from the *hurricane* deck, then *below* the level of the wharf. Quitting the boat for the rail again, we were soon on a road, the Southern Counties, which we concluded to be chiefly remarkable for the slow rate at which it could travel, no less than four and a half hours being taken to cover the 65 miles between Digby and Yarmouth.

At Yarmouth, the most southern point touched in our trip, we had expected to find considerable change in the vegetation, but this was less marked than we had looked for, so that a considerable part of the four days spent here was devoted to mounting sea-weeds and drying the plants, of which we had a very large accumulation on hand. A modification of Mr. Macoun's method of drying mosses was tried on flowering plants and found to work most successfully. Our hotel being provided with an unroofed balcony, as soon as the sun had thoroughly heated the floor of this, we took our plants, and placing each sheet of specimens between two driers, covered the floor with a layer, small stones at the corners of the sheets preventing their disturbance by the wind. Only one thickness was spread at a time, and no pressure used except the weight of the single drier covering the specimens. The plan was admirable for plants wilted by a couple of days in press, an hour under a hot sun serving to completely cure specimens that would have taken four or five days changing;

but with ones fresh or insufficiently wilted, the process was useless, as the absence of pressure allowed the leaves to curl up. Plants thus preserved seemed to keep their color better than when done by the ordinary method, but were, I fancy, rendered more brittle. A marked feature of Yarmouth and vicinity were the cut hedges of white or English thorn, which, in connection with the trees and flowers extensively planted, had a very pleasing effect. Fogs, however, were very prevalent, and the melancholy sound of the fog horn constantly ringing in the ears had anything but a cheering influence over a stranger. Of our findings here the most noteworthy were *Lepigonum salinum*, Fries, on brackish sands; *Alchemilla vulgaris*, L., abundant in waste places, and in fields bordering the harbor, *Galium Aparine*, L., on a bar running out into the sea, where also were *Potamogeton pectinatus*, L., in brackish pools, and *Allium Schœnoprasum*, L., in large bunches on dry ground, but close by; *Tussilago Farfara*, L., common along the streets and railway track; *Symplocarpus fœtidus*, Salisb., (the only place we saw it in Nova Scotia), in a pasture field near the lighthouse on Cape Forchen; and *Rhinanthus Crista-galli*, L., everywhere. *Scirpus pungens*, Vahl., and *Carex salina*, Wahl., *tentaculata*, Muhl., *filiformis*, L., and *viridula*, Mx., were also collected, as were *Agrostis alba*, L., *Elymus mollis*, Trin., *Aira cæspitosa*, L., and *Holcus lanatus*, L. The last was very plentiful in the fields, but especially so along grassy banks overhanging the water.

Several probably paying localities had been marked on our way down from Halifax, and the first of these to be reached on our return journey was Annapolis. All about us now was historic ground, this being the ancient capital of Acadia and the oldest European settlement north of the Gulf of Mexico. Visited by the French under Champlain in 1604, it was made the following year the site of their first colony in America. Then Porte Royale, it remained so till a century later, when, captured by the English, the name was changed in honor of Queen Anne to Annapolis Royal, since abbreviated to Annapolis. Like other Acadian strongholds the fort is now a ruin, and the place that once rang with the tread of armed men echoes with the merry laughter of children, whose play-ground it is. What a pleasant memory is the evening hour spent on the old grass covered ramparts, the sea with its never ceasing murmur at our feet, and old North Mountain frowning grandly down upon it. What a pleasure, too, is the possession of souvenirs of our visit in *Hyoscyamus niger*, L., found blooming freely in the decaying earth-

works, and *Lychnis vespertina*, L., growing abundantly, not only in the old cemetery connected with the fort, but in the streets, fields, and waste places all about the town. A drive into the country showed the antiquity of the settlement in *Aquilegia vulgaris*, L., *Inula Helenium*, L., *Lysimachia vulgaris*, L., and other tall growing flowers and weeds completely naturalized and established by the roadsides. *Alopecurus pratensis*, L., introduced by the French and known as "French timothy," was the grass generally cultivated for hay, but occasional patches of *Dactylis glomerata*, L., were seen. In the salt marshes *Juncus Gerardi*, Loisel, was in beautiful flower and made quite a show along the beach, where also were seen *Scirpus maritimus*, L. and *Glyceria distans*, Wahl. Between the marshes and the road were, in low ground, *Liparis Loeselii*, Richard., *Scirpus microcarpus*, Presl. and *Carex Pseudo-Cyperus*, L. and *conoidea*, Schk., and on gravelly banks, *Trifolium hybridum*, L. A remarkable form of *Corallorhiza multiflora*, Nutt., was found in the woods near the residence of Mr. Pittman, a gentleman who had kindly invited us to visit him. In shape the flowers were those of *multiflora*, but the whole plant, except the petals, was, in all cases, pale yellow instead of brown or purplish. A day was given to a deep defile in North Mountain, known as the "ice gorge," from the fact that under the rocks there, ice can be found all summer. The bottom of the ravine was occupied by a rivulet clear as crystal, while its sides were densely clothed with a fine growth of hardwood, among which *Ostrya Virginica*, Willd., was noticed for the first time. In places the sombre woods were lightened by the delicate pink flowers of the wood-sorrel, *Oxalis Acetosella*, L., or, as it is sometimes called from its blossoms being supposed to ring the chimes that call the spirits to their moonlight revelry, "fairy-bells;" and in others, ravishing beds of the wax like *Moneses uniflora*, Gr., loaded the air with fragrance. *Osmorrhiza brevistylis*, DC., *Pyrola chlorantha*, Swz., *Epiphegus Virginiana*, Bart., *Habenaria orbiculata*, Torr., *Listera cordata*, R. Br. and *convallarioides*, Hook., *Corallorhiza innata*, R. Br. and the common form of *multiflora*, Nutt., *Eleocharis obtusa*, Schultes, *Carex rosea*, Schk., and *Cystopteris fragilis*, Bernh., were also collected and fully compensated us for our tiresome climb over the rough sides of the mountain.

Our next stop was at a little wayside station, Kingston, to examine the bad lands lying along this part of the railway. The sand hills, covered with the withered flowers and half-ripened fruit of *Hudsonia ericoides*, L., where a week before they had

been a mass of golden bloom, gave evidence of the advance of the season. The same localities abounded in *Corema Conradii*, Torr., with immature fruit, and *Arctostaphylos Uva-ursi*, Spreng, while *Comandra livida*, Richardson, was found in a sandy slashing in the woods. Growing along the track was a depauperate form of *Rosa lucida*, Ehrh., and in a woodland back of the station *Helianthemum Canadense*, Mx., *Spergula arvensis*, L. in fields, *Pilea pumila*, Gr. in low woods, *Panicum depauperatum*, Muhl. on dry banks, and *Amblyodon dealbatus*, Pal. Beauv. on the bottoms of dried up hollows in cranberry marshes, were also picked up, and made welcome additions to our list. In a swamp at Bridgetown, a neighboring village, is a fine grove of *Thuja occidentalis*, L., a tree, we were informed, which, though common in the adjoining province of New Brunswick, is very scarce in Nova Scotia.

Jumping from Kingston to Kentville, behold us in a very pretty little town, with many of the streets bordered with magnificent specimens of *Ulmus Americana*, L. It was our starting point for a drive across Annapolis valley, famed for its fertility, to the "Look-Out" at Cape Blomidon. The valley lies between the North and South mountain ranges, and thus sheltered from the cold winds and chilling fogs of the Bay of Fundy, with a wonderfully rich soil, has earned the title of the "Garden of Nova Scotia." Early morning saw us under way, our path lying past vast orchards and fertile farms, each vying with the other in its appearance of thrift and good husbandry. Picking up, *en route*, *Potamogeton gramineus*, L., *Sagittaria variabilis*, Eng. var. *angustifolia*, Gr., and *Carex hystricina*, Willd, by noon we had reached the mountain top, and a glorious prospect lay at our feet. Five counties were in view at once, and the panorama of fields, meadows, and orchards, with the white farm houses surrounded by trees, and here and there a village with its church spires glancing in the sunlight, was one seldom surpassed in any land, and which, once seen, could never be forgotten. While feasting our eyes on the scene, we had the good fortune to detect *Botrychium matricariæfolium*, A. Br. along the grassy roadside, while in crevices in the face of the cliff were fine bunches of *Woodsia Ilvensis*, R. Br.

On leaving Kentville our road entered the country which Longfellow has made famous. From Grand Prè, literally "great meadow," one has only to look about on the ocean of billowy grass to see how apt was the name, and we can not wonder at the unwillingness of the Acadians to quit so peaceful a spot. Few

traces of the French village are now to be found, but the hollows that once were the cellars of their houses are still pointed out. There, too, now gnarled and decaying, are the willows that formerly lined the streets and perhaps witnessed the troth-plight of Gabriel and Evangeline, while the dykes, built to keep the sea from their meadows, and at which sturdy Basil himself may have lent a helping hand, yet serve the same useful purpose. Great as is the charm of the place to the poet or sentimental tourist, it offers but scant attraction to the botanist, and accordingly we pushed on to Windsor, passing, just on the outskirts of that place, the old homestead of "Sam Slick" (Judge Haliburton). The Avon, on which the town is built, is principally made by the tide from the Basin of Minas, and is a noble stream at high water; at low water, shorn of its beauty, the banks and far-stretching flats of red mud are something stupendous. Strolling out to Fall Brook, about four miles from the town, in low places along the highway were found *Juncus articulatus*, L. and *Carex retrorsa*, Schw., and on the hillsides bordering it *Panicum dichotomum*, L. In meadows by the creek were fine specimens of *Oxalis corniculata*, L. var. *stricta*, Sav., and *Oenothera pumila*, L., while *Carex panicea*, L., grew along a ditch being dug for the waterworks in a boggy field. A day having been put in at this place, we boarded the evening train for Halifax, and hastened to seek in our new quarters a much needed rest.

On July 3d we turned, for the last time, our faces away from Halifax, preparatory to a run through Cape Breton, the northern extremity of the province. At Bedford, nine miles from the city, in addition to a host of new, many of our old acquaintances reappeared, and in much better collecting condition. Near the "Prince's Lodge," once the residence of the Queen's father, the Duke of Kent, for a long distance the railway track was covered with beautiful specimens ot *Aquilegia vulgaris*, L., in both flower and seed. Here likewise was a very large-flowered form of *Geranium Carolinianum*, L., and in rocky places *Poa cæsia*, Smith. Dry gravelly roadsides yielded *Urtica dioica*, L., and boggy spots were brilliant with *Myosotis laxa*, Lehm., or, as Coleridge so prettily describes it,

> "That blue and bright-eyed flow'ret of the brook,
> Hope's gentle gem, the sweet forget-me-not."

Notes on the North American Forms of Podosphæra.

BY F. S. EARLE.

I have lately examined a number of specimens of this genus, from different localities and on different host plants, with a view of trying to determine their specific relations.

Although quite a marked difference may be observed between perithecia taken from the same leaf, specimens on the same host plant from different localities resemble each other quite closely, and these forms may be characterized as follows:

1. Form on *Prunus Cerasus*.

(From four specimens, different parts of Illinois.)

Amphigenous, fruiting plentifully on the lower side of the leaf; perithecia dark brown, from .00275 in. to .00375 in. in diameter; appendages dark brown for more than half their length, sometimes forking near the base, varying in number from 8 or 10 to as many as 18 or 20, placed irregularly on the upper surface and ascending at different angles, varying greatly in length, even on the same perithecium, $1\frac{1}{4}$ to $3\frac{1}{2}$ times the diameter; tips hyaline, 3 to 5 parted, much swollen.

2. Form on *Prunus Americana*.

(One specimen, Dixon, Ill.)

Amphigenous, fruiting below; perithecia .0025 in. to .00325 in; appendages few, about 6 or 8, placed irregularly, but sometimes ascending nearly parallel, $1\frac{1}{4}$ to 2 times the diameter, 4 or 5 times parted, tips not much swollen.

3. Form on *Amelanchier Canadensis*.

(Two specimens from Massachusetts and Connecticut. Coll. A. B. Seymour.)

Amphigenous, or epiphyllous; perithecia .00275 in. to .00325 in.; appendages 8 to 16, 2 to 3 times the diameter, much as in the form on *Prunus Cerasus*, but rather darker and less variable, tips swollen.

4. Form on *Spiræa tomentosa*.

(Two specimens, Massachusetts. Coll. A. B. Seymour.)

Amphigenous, fruiting both sides of leaf or more abundantly above; perithecia small, .0025 in. to .00325 in.; appendages numerous, 12 to 24, radiating from all parts of the upper surface, 1 to 2 times the diameter, 3 to 5 times parted, tips only slightly swollen.

5. Form on *Cratægus*—

(Three specimens from Illinois.)

Amphigenous or epiphyllous; perithecia small, .0025 in. to .003 in.; appendages 8 to 12, mostly curving upward, but not fascicled, 1 to 2½ times the diameter, 3 to 4 times parted, tips somewhat swollen.

These forms all have septate appendages and do not differ materially in their spores and asci. The differences that do appear are chiefly in the size of the perithecia and in the number and length of the appendages. As these vary more widely in perithecia from the same leaf than do the averages of the different forms, there seems no ground for their separation into distinct species, unless we allow more weight to the difference of host plant than is usual in the *Erysiphei;* but they should be considered as belonging to a large, widespread, variable species, comparable with *Erysiphe lamprocarpa*, Lev. and *Microsphæra penicillata*, Lev.

Saccardo, in his "Sylloge Fungorum," gives *Podosphæra Oxyacanthæ* (DC.) De Bary, with "appendages 8 to 10, about equal to the perithecium," on species of *Cratægus* in Europe, Algeria, etc. Our form on *Cratægus* agrees well with this description, except that the appendages are sometimes a little longer, which we have seen to be an unimportant character.

He divides the forms that have usually been referred to *P. Kunzei*, Lev. between *P. myrtillina*, Kunze, having "6 to 10 appendages, three times the diameter, radiating divergently," on *Vaccinium* in Europe; and *P. tridactyla*, (Wallr.) De Bary, having "few, 3 to 7 appendages, three times the diameter, rising in a parallel bundle," on species of *Prunus* in Europe and North America.

Two European specimens in my collection on *Prunus domestica* and *Prunus Padus* show the peculiar character of *P. tridactyla*, having the few appendages clustered at the summit of the perithecium and rising in a parallel bundle. A part of the perithecia from the specimen on *Prunus Americana* (see above), approached this form rather closely, but in all the other specimens examined the appendages are more or less widely divergent, thus seeming to bridge the difference between this form and *P. myrtillina* Kunze[1].

The form on *Spiræa* has been described by Howe in Vol. 5, of the *Torrey Bulletin*, under the name of *P. minor*.

As *Erysiphe Oxyacanthæ* DC., was the earliest name given

[1]Having never seen specimens on *Vaccinium*, I can not, of course, say that this is to be included with the other forms, but there is nothing in the description by which it can be separated.

to any of these forms[1], that specific name will have to be retained for the combined species which may be characterized by the following description:

PODOSPHÆRA OXYACANTHÆ (DC.)

Erysiphe Oxyacanthæ, DC.; Podosphæra clandestina (Wallr.) Lev.; P. myrtellina, Kunze (?); P. tridactyla (Wallr.) De Bary; P. Kunzei, Lev.; Alphitomorpha tridactyla, Wallr.; Podosphæra minor, Howe.

Mostly amphigenous; perithecia .0025 in. to .00375 in. in diameter, dark brown, reticulations large and prominent; appendages variable, from four or five to twenty or more, septate, colored for half or more of their length, variously parted, tips sometimes much swollen; ascus oval, thick walled; spores 8.

Podosphæra biuncinata, C. and P. on *Hamamelis*, is a distinct, well marked species, having long, slender hyaline appendages.

Additions to the Habitats of N. American Sphagna.

For several years past the writer has made excursions into the southern parts of New Jersey in order to examine and note the distribution of the various species of *Sphagnum*, and the most important results are herewith given. The varieties new to this country are indicated in small caps.

Sphagnum Portoricense, Hampe, occurs in ponds at Pleasant Mills, Atlantic Co.; at Atsion & Brown's Mills, Burlington Co.; at Malaga, Cumberland Co., and at Willow Grove, Gloucester Co.

Sphagnum imbricatum, Hernsch. (*S. Austini*, Sull.), occurs in swamps at Toms River, Ocean Co.; at Atsion, Burlington Co.; near Newfield, Gloucester Co.; also in the northern part of New Jersey, at Budds Lake, Morris Co.

Dr. G. Martin, of West Chester, Pa., while in Florida, during the month of March, this year, sent me a lot of Sphagna for identification, amongst which I was fortunate enough to detect a number of plants of *S. imbricatum*, Hornsch. This species has not, to my knowledge, been heretofore found south of New Jersey.

Sphagnum papillosum, Lindbg., is found in bogs near Toms River, Ocean Co.; Atsion and Quaker Bridge, Burlington Co., and in fruit near Newfield, Gloucester Co.

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[1] I am under obligation to my friend Mr. A. B. Seymour, of Cambridge, Mass., for aid in establishing the nomenclature of this subject, as well as for many of the specimens from which the above descriptions are taken.

Var. CONFERTUM, Lindbg., near Newfield, Gloucester Co.;
Sphagnum cymbifolium, Ehrh., var. *squarrosulum* (Nees.) in bogs, Atsion, Burlington Co.

Var. CONGESTUM, Schimp. (var. *purpurascens*, Russow.,) occurs near Newfield, Gloucester Co.

Sphagnum acutifolium, Ehrh., var. DEFLEXUM, Schimp., margins of bogs, Newfield, Gloucester Co.

Var. ELEGANS, Braithw., open bogs, Atsion, Burlington Co.

Sphagnum subsecundum, Nees., var. AURICULATUM, (Schimp.) Lindbg., swamps near Newfield, Gloucester Co.

Var. OBESUM, Wils., swamps near Atsion, Burlington Co.

Sphagnum neglectum, Angstr. var., swamps near Newfield, Gloucester Co.

Sphagnum macrophyllum, Bernh., in ponds at Willow Grove, Cumberland Co., and Malaga, Gloucester Co.

EUGENE A. RAU, *Bethlehem, Pa.*

GENERAL NOTES.

Vitis riparia.—As represented in this locality this is a strong, vigorous climber, growing in bottoms and low grounds along streams; the flowers appear from one to two weeks later than any other species of *Vitis* here, but the fruit is ripened remarkably soon.

Usually we have ripe grapes the first week in July, but this season was very backward with late frosts, and I saw no ripe fruit until the 12th of July, while the so-called Summer grape (*V. æstivalis*) ripens its fruit about the middle of September. Now, as our manuals call this a Winter or Frost Grape, and it is so stated in the Floras of Iowa and Michigan, I would inquire if this is the usual habit of the plant in other localities?

The panicles are shorter and closer, with smaller and sweeter berries than those of *V. cordifolia*.

Here it is called Fox, Slue, or Sioux Grape.—FRANK BUSH, *Independence, Missouri.*

Graphephorum festucaceum, Gray.—Last July, while collecting *Scirpus fluviatilis*, Gray, in a small slough about a quarter of a mile west of my house, I found a grass which proves to be an interesting discovery. Judging it to be a *Graphephorum*, though differing from the description of the single species and its variety *major* in the Manual, I sent it to Dr. Gray for determination, who promptly reported it to be *Graphephorum festucaceum*, Gray, (*Arundo festucacea*, Willd.), for the first time in the United States so far as he knew, and who requested me to announce this addition to our flora in the BOTANICAL GAZETTE. He adds, however, that it abounds in the Saskatchewan region, and is well

known in N. Europe. In Dr. Vasey's recent paper on "The Grasses of the United States," the range given is from British America to Alaska. The present locality, therefore, extends its range several hundred miles southward. It probably occurs in Minnesota, as I found it but six miles south of the state line. It grows quite rank, in water from one to two feet deep, along with such plants as *Scirpus fluviatilis*, Gray, *S. validus*, Vahl, and *Typha latifolia*, L.—R. I. CRATTY, *Armstrong, Iowa.*

Sarcodes sanguinea.—Mrs. Austin's interesting note I only saw recently, on my return from the Pacific. While in the Yosemite Valley, on the 17th of June, Dr. Chas. Schaffer, of the Philadelphia Academy, Mr. J. M. Hutchings, the well-known and estimable guardian of the Yosemite, and I, took a pick-axe to Glacier Point especially to study the snow plant. We dug out carefully a fine specimen. It had started about a foot below the surface. We took the mass of earth to a neighboring pool, and washed out as gently as possible every particle of earth. In this way we found to a positive certainty that there was no attachment whatever to the roots of any other plant. The forest growth consisted of *Abies concolor*. There was nothing else growing near the snow plant. We may say positively it is not a parasite in the usual sense of the word. Is it a saprophyte—a plant of the *Monotropa* type, feeding on decaying vegetable matter? We could find no trace of vegetable matter more than is found in any ordinary earth, except here and there a few scattered pieces of charcoal about the size of peas, and not many of these. There was really nothing to indicate that the plant might not live and grow as ordinary plants, just as Mrs. Austin suggests, except the absence of ordinary roots. The roots, if they may be so called, consisted of a coralline mass, like unto, but larger than we find in *Corallorhiza*, *Monotropa*, and similar "saprophytes." Is it a perennial as Mrs. A. believes? I know *Corallorhiza* will come up for several years from pieces planted of these coralline masses. There is no reason why *Sarcodes* should not. However, I planted in a piece of woodland on my premises two very large masses kindly sent to me by a lady in Nevada, but there was no sign of their appearance last year. I have sown seeds now which I brought from the Pacific, in this piece of woods, to give them a chance to take any course they choose.

Those who have the opportunity will, I think, confer a great botanical service by studying closely this plant. We have come to believe that parasites with green leaves like the mistletoe, take crude sap from the foster plant and elaborate it for themselves, and that the paler plants take the sap already elaborated, and hence have no use for green leaves. If plants like *Sarcodes* feed neither on the living nor on the dead, they should have green leaves; or is it not necessary that they should obtain anything whatever from the atmosphere? I have thought that such plants as *Epiphegus* and some others are parasitic in the earlier stages, form this coralline mass, cut loose from the parent, and then live for some time on the mass so formed; but the evidence I have had does little more than suggest this. It seems to me there is a very interesting field open for those who have the opportunity for investigation.—THOMAS MEEHAN.

Zinnia grandiflora, Nutt.—In the latter part of July last, while botanizing in the vicinity of Pueblo, Colorado, I found this species of *Zinnia* in great abundance, and was especially struck with its singular and, to me, novel method for the dispersion of its seeds. The plants, though rarely more than four or five inches in height, were very showy, because of the abundance of their bright yellow flowers, large for the size of the plants. When I came to examine them somewhat closely I found that much of their conspicuousness was due to the fact that the ray-flowers, even of the oldest heads, though they had become dry and rigid, had lost but little of their original color. Further observation revealed the fact that the rays are persistent even until after the akenes are fully ripened. The heads then fall or are detached entire from their peduncles, and the thin, light, stiff rays, now answering for wings, they are carried away by the wind to great distances from the parent plant. By this method the seeds are dispersed for the growth of another year.

I record the fact as one of great interest. I have never seen the like artifice employed by any other plant for the dissemination of its seeds, nor seen such a one noticed by any writer.

I met the plant soon after in New Mexico, where it seemed equally abundant. It is well figured and described in Dr. Torrey's botanical contribution to Emory's "Notes of a Military Reconnoissance," p. 144.—DAVID F. DAY, *Buffalo, N. Y.*

Notes from the New York Agricultural Experiment Station.—In chapter xi, "Animals and Plants under Domestication," Darwin says that it is worth mentioning that he "fertilized the purple sweet pea (*Lathyrus odoratus*) with pollen from the light-colored Painted Lady. Seedlings raised from one and the same pod were not intermediate in character, but perfectly resembled both parents." I can offer some parallel illustrations:

Kernels of Waushakem flint corn, exposed last year to hybridization from Minnesota dent, planted this year, yielded ears of perfect Waushakem and perfect Minnesota type, without any intermediates. Kernels of Minnesota dent likewise exposed last year, yielded this year perfect ears of Minnesota dent and Waushakem corn without intermediates. Again, hybrid kernels from flint and sweet crosses have flint and sweet ears, without any intermediates, and flint and dent crossed kernels ears of flint and dent corn without any intermediates. Pop corn kernels likewise produced sweet corn, flint corn and pop corn ears, but no intermediates.

In crossing sweet and wrinkled peas, smooth and wrinkled peas were found in the same pod, but no intermediates. In crossing a smooth pea with pollen of the sugar pea, the pod was of the garden type, the seed of the sugar type.

Blue seed produced both blue and cream-colored peas, and cream-colored seed produced, occasionally, blue seed—excellent evidence in favor of the view that natural crossing occasionally takes place.

William the First, a smooth pea, planted late, but the pods harvested in a ripe condition, yielded wrinkled peas for crop.—E. LEWIS STURTEVANT, *Director.*

EDITORIAL NOTES.

M. L'ABBÉ ANZI, an Italian lichenologist, died recently.

PROF. DR. TH. NITSCHKE, director of the Botanic Gardens in Münster, Germany, died August 30, in his fiftieth year.

PROF. WM. TRELEASE gave four lectures during the month of January before the Johns Hopkins University, on the fertilization of flowers.

DR. GEO. VASEY, in the December *Torrey Bulletin*, describes two new species of grasses, *Agropyrum Scribneri* from Montana, and *Sporobolus Buckleyi* from Texas.

CARL SALOMON has recently published "Nomenclator der Gefässkryptogamen," giving the genera, species, synonymy and distribution of the higher cryptogams; a much needed work.

BULLETIN No. 7 of the Illinois State Laboratory of Natural History, to be issued soon, will be devoted to a "Descriptive Catalogue of the North American Hepaticæ," by Prof. L. M. Underwood, of Syracuse University.

PROF. BURRILL calls attention in *Science Record* to a common mistake of supposing that *pébrine* of silk-worms is caused by *Micrococcus bombycis*, when instead it produces the quite distinct disease of *schlaffsucht* to which caterpillars are subject.

THE BULLETIN of the Botanical Society of France contains an account of the germination of the oospores of *Peronospora viticola*, the grape mildew, stating that, contrary to preconceived opinion, zoospores are not formed, but a mycelial tube is at once pushed out.

IN THE JANUARY *Naturalist* Prof. Bessey gives an account (with cuts) of hybridism in *Spirogyra*, observed last August at Ames. *S. majuscula* and *S. protecta* were seen to conjugate, the zygospore resembling those of *S. protecta*, this species also being functionally the female.

G. HABERLAUDT SHOWS that the so-called rudimentary fibro-vascular bundle in the center of the stems of mosses is a water-conducting bundle. An aqueous solution of resin rises in the central bundle only, and quite rapidly there, when the cut end of a stem is immersed in it.

THE STATES OF Indiana, Illinois, Michigan and Wisconsin are included in the last "Contributions toward a List of the State and Local Floras of the U. S." by W. R. Gerard and N. L. Britton. This list, when completed, will prove a most valuable one, as, judging by our own State, it is a most reliable one.

AT THE NOVEMBER meeting of the San Diego Natural History Society Dr. Parry gave an interesting account of the singular *Pinus Torreyana*, which was discovered by him in 1850. As the range of this species is confined to a narrow strip of coastline not more than four miles long, the society is taking measures for its preservation.

In Science Gossip for January, W. B. Grove gave some "Notes on Yeast-Fungi," being a translation from Dr. Winter's edition of the "Kryptogamen-Flora," with notes by the translator. Twelve species are described and figured.

Cinchona Ledgeriana has been having quite an airing in the *Journal of Botany*, the last number adding still another to the long list of papers on the subject. The editor probably voices the wish of all his constituency when he brackets at the close of the article these words: "This discussion is now closed.—Ed. Journ. Bot."

The "Fungus Forays" of the Natural History societies of Britain were not so successful last season as usual, owing to unfavorable weather and a scarcity of specimens. Probably the most interesting item was the finding of thirty-four species of *Cortinarius* in the vicinity of Hereford, during a four days gathering of the Woolhope Field Club.

It seems that *Sphæria Coulteri*, Peck, collected in 1872 near Yellowstone Lake, turns out to be the representative of a new genus, which Professor Saccardo describes in the *Torrey Bulletin* for December, and names *Neopeckia*, thus associating Professor Charles H. Peck's name with that of the writer in a way that is very pleasant to the latter.

Lignification has heretofore been supposed to be confined to internal tissues, but A. Lemaire shows (Ann. Sci. Nat. xv, p. 297) that the epidermal cell walls may undergo this change. A section of the epidermis, transferred from an alcoholic solution of phloroglucin to hydrochloric acid, has its lignified parts colored a beautiful rose-red.

In 1882 Mr. A. Stephen Wilson published an account of the discovery of certain bodies found in potato leaves, which he claimed to be sclerotia of *Phytopthora infestans*, which view Mr. Plowright accepted. In the December *Journal of Botany*, Mr. Murray and Dr. Flight publish the results of an investigation of specimens furnished by Mr. Wilson, which go to show that the so-called sclerotia are merely masses of oxalate of lime.

Heckel gives an account in the *Bulletin* of the *Société géogr. de Marseille* of the African nut called Kola. It is the product of a tree belonging to the order *Sterculiaceæ* of which the chocolate tree of tropical America is a member. The chemical composition of the two fruits is much alike. Kola is very highly esteemed by the African tribes, often bringing its weight in gold-dust, and in periods of scarcity a slave being required for a single nut.

Byron D. Halsted, in *Science* for Jan. 11, contends for the use of italics in printing scientific names, which does not accord with the practice in that periodical, nor the views of its editor. *Science* is a radical in the use of type, and some of the changes introduced seem not a little absurd to those acoustomed to a very different order of things. In reference to the use of italics for scientific names, however, the writer has found its greatest convenience in the saving of time. Such names are thus made catch-words, and a glance down a page reveals the species spoken of and invites either to skipping or a closer reading.

BOTANICAL MICRO-CHEMISTRY is growing in importance if one may judge by the number of reagents coming into use. Eighty-eight, including *only the more important ones* in use up to June, 1883, are now advertised by Dr. Theodor Schuchardt (Görlitz). While only a very few of these are necessary in the ordinary study of histology, many of them are absolutely indispensable in the delicate investigations concerning the nucleus, bacteria, contents of cells, nature of cell walls, etc.

THE HANDBOOK of British Fungi, by M. C. Cooke, published in 1871, has been almost as useful to students in this country as in England, and the announcement of a revised edition will meet with special favor from American botanists. The author, being unable to prepare the whole work at once, will give the Hymenomycetes in an appendix to *Grevillea*. The first installment in the December number, beginning with the white-spored agarics, embraces descriptions of thirty-eight species.

A PAPER HAS RECENTLY been read before the Linnean Society, by Mr. A. W. Bennett, on the reproduction of the *Zygnemaceæ*. His investigations go to support the views of De Bary and Wittrock, long since stated, that there are sexual differences in the conjugating cells. The cell taken to represent the female is greater in length and diameter than the other, and it is found that the protoplasmic contents pass only in one direction, and that change first begins in the chlorophyll bands of the supposed male cells.

SECTIONS OF DIATOMS have been obtained by W. Prinz, by a rather unexpected method. Sections made by imbedding a mass of diatoms in gum and cutting with a razor not proving satisfactory, Prinz boiled pieces of diatomaceous earth in Canada balsam and then ground fragments thin by the same process used in preparing mineral sections. He says: "In this way I have obtained thin laminæ of about a square centimeter in surface, containing hundreds of sections at right angles to the long axis of the frustule. These preparations * * * were of extreme thinness, in spite of the friability of the material."

PROF. D. S. JORDAN, in a recent visit to England, strolled into the village of Down in Kent, and talked with some of the villagers about Mr. Darwin. It is astonishing what little knowledge of his greatness had spread around his home. Among much interesting testimony from the villagers, the following statement of Mr. Parslow, for many years his personal servant, is especially interesting to botanists:

"The gardener used to bring plants into his room often of a morning, and he used to tie bits of cotton on them, and try to make them do things. He used to try all sorts of seeds. He would sow them in pots in his study."—*Am. Nat.*

VOLVOX GLOBATOR has long been considered a *hollow* spherical colony of unicellular algæ. Mr. J. Levick thinks that *Volvox* is not hollow but that the colony encloses a perfectly transparent gelatinous material which can be made evident by transferring some roughly handled (and probably thus ruptured) *Volvoces* to water containing powdered carmine. The carmine will adhere to surfaces exposed by the rupture of the superficial colony. Of sections of Volvox

he says: "The contents are so perfectly colorless that they are quite imperceptible in water, unless it be charged with suspended matter, and then only show their presence by displacing this matter from the space which they occupy themselves."

THE WRITER READ recently an article, written by some enthusiastic convert, which was considered to contain some startling proofs of the doctrine of evolution. It is not worth mentioning, except that it represents a class of dabblers in science who, through gross ignorance, misinterpret discoveries and spring their startling deductions upon a gullable public. As it is this class that courts the daily press, and especially infests the weekly, the public mind is generally in an abused condition. The "mycologist" referred to had evidently read Dr. Cooke's little book on fungi, and at once became an ardent theorizer. He now claims that he can prove evolution off hand, for his reading of fungi literature assures him that it is a common thing for one genus to turn into another, and even for neighboring families to lose their identity in each other. *Uredo*, *Æcidium*, *et al.*, are to him genera, whose partition walls can be broken down only to prove the doctrine of evolution. To all this an agriculturist remarks: "If these things are so, can we stand out longer against the 'wheat and cheat' idea?" With such enthusiastic expounders, mycology, evolution and agriculture ought all to flourish, and the public mind be kept in a feverish state of excitement.

IN THIS DAY of hasty publication of new species, when every collector feels competent for this difficult work, it is refreshing to read in the *Naturalist* some suggestions by Prof. Bessey in regard to the publication of new species. There is no doubt that the right to describe stimulates the study of Systematic Botany, but such stimulation too often results in utter confusion. As cautious as the editors of this journal have been in this respect, and they are conscious of having frequently given offense to contributors, they have published species that had no right to stand, and they are perfectly willing to adopt either of the following suggestions of Prof. Bessey:

1. Every description to be accompanied by the statement that type specimens were deposited in this or that established herbarium.
2. Every description to be accompanied by specimens to be distributed by the editor of the journal giving such publication.

The third suggestion, that specimens should be deposited in the National Herbarium, is too restricted when we consider the present relative importance of our herbaria. We consider the first suggestion as the most feasible, and the second as most complete, but impracticable.

CURRENT LITERATURE.

Notes on the Cryptogamic Flora of the White Mountains. By W. G. Farlow. Extr. from Appalachia, vol. III., part 3, Jan. 1884, pp. 232–251.

This is an important contribution to the flora of a district of which the flowering plants have been well known for many years, but the algæ and fungi of which have been almost totally neglected. As a contribution to a knowledge

of the distribution of some of the thallophytes, especially as affected by altitude, it is also interesting. In general it may be said that the thallophytic flora turns out to be similar to that of the Adirondacks and to the alpine and arctic flora of Europe. Twenty-three algæ are enumerated, and about one hundred and ten fungi, part of the latter, however, being the so-called imperfect or secondary forms. The following new species are described: *Propolis circularis*, *Sticta Tsugæ*, *Cylindrosporium Gei*, *Cercospora Pyri*, *Ramularia Oxalidis*. The primary object in visiting the region was to study the occurrence and distribution of the *Peridermia*. Three species were found. The first, *P. abietinum* (*P. decolorans* Pk.), on dwarf *Abies nigra*, is alpine. There are two forms known in Europe, one of which is supposed to be the æcidial stage of *Chrysomyxa Rhododendri*. This is the one collected, and although the *Chrysomyxa* could not be found, its supposed host affected the same situations as those of the *Peridermium*. The second, *P. balsameum*, on *Abies balsamea*, is sub-alpine. It differs but slightly from *P. columnare*, the European form associated as its æcidial stage with *Calyptospora Goeppertiana*. Its distribution, both in the White Mountains and in other parts of the country proves to be the same as of the *Calyptospora*, and so far as that goes, indicates that they are stages of the same species. The third *Peridermium*, *P. Peckii*, found at the base of the mountains, could not be connected with any teleutosporic form.

Botanical Micro-Chemistry, an Introduction to the Study of Vegetable Histology, by V. A. Poulsen. Translated with the assistance of the author and considerably enlarged, by William Trelease. Pp. 109. Cassino.

In the GAZETTE for August, 1883, Carl Müller's translation of this book was reviewed, and the hope expressed that we might have an English translation. That wish was hardly expressed before we learned that Prof. Trelease was undertaking the work, and in the neat volume before us we have the result. It is not necessary to repeat here the commendations of the previous review, but simply to give notice that the book is in the market, and is in every way one suited for the laboratory student. Some might prefer a different binding and thinner paper for a laboratory guide, but it is hard to make a publisher do less than his best, and this surely is an improvement on the style of Penhallow's Vegetable Histology. No one was better fitted for this translation than Prof. Trelease, and his thorough acquaintance with every detail of laboratory work make his additional notes (always signed with his own initials) not the least valuable part. A complete index adds to one's comfort, and we bespeak for this little book the careful attention of all students of Vegetable Histology.

The True Grape Vines of the U. S. and the Diseases of the Grape Vines. By Dr. Geo. Engelmann. Reprinted from the Bushberg Catalogue, pp. 9–20.

The Grape Manual, from which this paper is reprinted, is a most satisfactory affair, and is really very different from the ordinary horticultural catalogue. Dr. Englemann's paper is but a sample of the thorough and scientific way in which every subject relating to grape vines is treated. In the reprint before us the subject is treated in Dr. Engelmann's usual complete way. A full account of our species of *Vitis* is given, with a key to their arrangement, and, what is of very great value to botanists, a table of grape seeds is given, by the help of which it would seem that any one could name the typical forms of grapes. The systematic arrangement of N. Am. grape vines is as follows: I. True grape vines, with loose, shreddy bark and forked tendrils, and II. Muscadine grapes, with firmly adhering bark and simple tendrils. The second division contains only *V. vulpina*, L. (*V. rotundifolia*, Mx.) The first division is subdivided into two groups: A, those with more or less continuous tendrils, including only *V. Labrusca*, and, B, those with intermittent tendrils. Group B is

subdivided into two sections based upon the pubescense or not of the leaves. In the pubescent or floccose section we have seed characters used for subdivisions, *V. candicans*, *V. Caribæa*, *V. Californica*, *V. monticola*, and *V. Arizonica*, having the raphe on the seed indistinct, and *V. æstivalis* and *V. cinerea* having the raphe very conspicuous. The glabrous-leaved section is also subdivided on the same seed character, *V. cordifolia* having the raphe conspicuous, and *V. palmata*, *V. riparia* and *V. rupestris* having the raphe indistinct.

The Elements of Botany: Embracing Organography, Histology, Vegetable Physiology, Systematic Botany and Economic Botany. Arranged for school use or independent study. Together with a complete glossary of botanical terms. By W. A. Kellerman, Ph. D., Professor of Botany and Zoology in the Kansas State Agricultural College, etc. 12mo. pp. x, 348. Philadelphia: John E. Potter & Co., 1883.

A reading of the announcement of this book awakened the hope that in it we might find something better arranged and proportioned than others on the same subject, but a perusal of the work is sadly disappointing. The preceding extract from the title page shows that Professor Kellerman has undertaken to compress a great deal of information into three hundred and fifty pages, and he has done this, unfortunately, at the expense of clearness and accuracy. In an endeavor to prepare a book whose brevity would suit it for use as a high school text-book on botany, the author has made a too common mistake by trying to tell too much in too small a space. In this, as in most of the school text-books on the biological sciences, the distinction between *education* and *learning* seems to be lost sight of. It seems to be the chief aim of their authors to put a vast mass of facts and definitions at the disposal of the student. After serving the immediate purpose of enabling him to pass the required examination, the book and its contents pass out of sight and out of mind. Whether or not such books are at all disciplinary depends on the teacher; if they are made so, it is *in spite of* their method, and not because of it.

In the particular volume under consideration, the proportion of one part to another is, in our opinion, extremely bad. Organography occupies 61 pp., Histology and Physiology 45, while Systematic and Economic Botany have 216. No wonder students "don't like botany" when they are fed on such dry husks. The amount of space to be devoted to any particular part of the subject may, however, be considered a matter of opinion, and we might easily forgive a mistaken judgment in this respect. Errors of fact and bungling statements and definitions are less easily overlooked, and this work abounds in both. One need go no further than the first page of text (p. 15) to find three examples of such. Only three organs, root, stem and leaves, are enumerated as visible, when "any common plant, such as a Grass, Rose-bush, Willow or an Oak" is examined. Why not trichomes? What would a pupil infer should he, by chance, actually examine a grass like *Panicum capillare* or any rose as to the relations of the hairs and prickles? A little further down we find "Hairs, *or* Trichomes. * * * * They are mostly *hair like.*[1]" In stating the differences between stems and roots it is said that "roots never produce buds" (p. 23), whereas every gardener knows how abundantly adventitious buds occur on the blackberry and other plants. On. p. 26 we read this in regard to bulb-scales: "This nourishment is consumed in such bulbous plants as the Hyacinth, etc., by the production of flowers *in advance of the leaves.*" What *Dionæa* leaves would do with a *third* lobe which they are said to possess (p. 27) is hard to conceive. Although claiming to reduce the number of technical terms, the author introduces such needless ones as *fibrillæ* for root-hairs (p. 16), *rachis* for the common leaf-stalk of a com-

[1] Italics ours.—ED.

pound leaf (p. 35), and the almost obsolete series, *monogynous*, *digynous*, etc. The attempt at extreme brevity results in inadequate explanations; e. g., "The leaves of Iris are equitant, that is, straddling over each other" (p. 37). No pupil of any age, unless familiar with the arrangement of the bases of the leaves of Iris, would get the slightest idea of what is meant by equitant leaves. Under stipules (p. 37), the student is told, "in *Galium* they are interpetiolar and as large as the leaves and exactly resemble them, so that the leaves are said to be *whorled;* but in reality they are opposite, the two intermediate leaves on each side being free stipules." If true of the 4 and 8-leaved Galiums, it is a very unnecessary fact for the student, and it is especially out of place in an "organography," which almost ignores homology. The unrestricted definition of a pistil as consisting of three parts, ovary, style, and stigma, is followed two pages later (p. 53) by the words concerning the pine cone: "The scale is, therefore, the pistil." Nor does the antecedent premise of the "therefore" explain the apparent contradiction. Would not the two ideas of a pistil be slightly confusing to a novice? On p. 64 is the following astounding definition: "When the flowers are evidently arranged to favor self-fertilization and prevent cross-fertilization, they are said to be cleistogamous." Nor are the following from pp. 92 and 95 very much better: "Certain other cells, or rows of cells, become modified into tubes or ducts, and form the string-like masses, or form fibers in the stems of the higher plants. These are the fibro-vascular bundles." "The fibro-vascular bundles are composed of tracheary tissue, sieve-tubes and parenchyma."

The illustrations of the book are "copious"—too copious, such as they are. The majority are photo-engravings from the author's original drawings, some from nature (we suppose), some copied from various sources and some from Vick's catalogue. In some cases the source of the copied illustration is acknowledged; in many cases, particularly when slightly altered, it is not. In few instances is the name of the plant, from which the illustration is taken, given. Aside from their complete lack of artistic finish, some of the drawings contain glaring errors. Fig. 21 shows accessory buds for adventitious ones. The leaves of *Dionæa* seem, in fig. 25, to be distinctly cauline. Fig. 90, the diagram of an umbel, shows a *pyramidal* cluster; nor is there anything in the text to correct the impression. Fig. 91, the diagram of a spike, shows the flowers *widely separated*, and fig. 95, of the cyme, is *globular*. Fig. 96 shows a flower of one of the Malvaceæ (not named) as the typical flower; at least it is the one to which reference is made when first describing flower parts. Fig. 182, of *Navicula viridis*, has the striations projecting one-third of their length beyond the edge of the valve. Fig. 202, of the stomata and intercellular spaces of the leaf of Pine, is beyond description. Fig 212, a section of a stoma of the potato leaf, shows the guard cells with walls as thick as sclerenchyma, and so on. Only the most glaring errors have been mentioned, and those named *are confined to the first hundred pages.*

As lesser blemishes may be mentioned the faulty etymology of some of the terms and the inconsistent method in the expression of the Greek words in English letters—as an example of the latter notice "*hypogynous* (Gr. *hypo*, under; *guna*, pistil)." p. 48. The adoption of the English system of measures and temperatures is made on the plea of unfamiliarity with the metric. When and how shall pupils become familiar with the metric system if they are not forced to see and use it?

Finally, the entire omission of an index adds an inconvenience to the use of a book already unfit for use because of its many mistakes; and as a general statement it will probably hold good that Dr. Gray and Prof. Bessey would prefer to do their own abridging.